CLAIMS:

1. Biocompatible and biodegradable implant for the filling of a cavity in a living organism such as, for example an extraction wound or any bone tissue defect, as obtained by fusing together through polymer linkage of polymer-coated biocompatible and biodegradable granules, said granules being made of biocompatible and biodegradable materials which are selected from the group consisting of biopolymers, bioglasses, bioceramics preferably calcium sulfate, calcium phosphate such as, for example, monocalcium phosphate monohydrate, monocalcium phosphate anhydrous, dicalcium phosphate dihydrate, dicalcium phosphate anhydrous, tetracalcium phosphate, calcium orthophosphate phosphate, calcium pyrophosphate, α-tricalcium phosphate, β-tricalcium phosphate, apatite such as hydroxyapatite, or a mixture thereof and said granules having an equivalent-diameter of about 350 μm to about 2000 μm, preferably 500 μm to 1000 μm and preferably being of a regular shape, such as, for example, a spherical shape; a major portion of said granules being coated with at least one biocompatible and biodegradable layer of a polymer selected from the group consisting of poly(α-hydroxyesters), poly(ortho esters), polyanhydrides, poly(phosphazenes), poly(propylene fumarate), poly(ester amides), poly(ethylene fumarate), polylactide, polyglycolide, polycaprolactone, poly(glycolide-co-trimethylene carbonate), polydioxanone, co-polymers thereof and blend of those polymers and said polymer layer having a thickness of 2 μm to 300 μm, preferably about 5 μm to about 20 μm, corresponding to a weight fraction of about 4% to about 15% of the weight of the said implant.

2. Biocompatible and biodegradable implant as obtained by claim 1, wherein the polymer-linkage is carried out such, that, after fusing of the granules together, an open interconnected porosity with macropores having average diameter from about 100 μm to about 500 μm, preferably about 200 μm to about 300 μm is achieved.

3. Biocompatible and biodegradable implant as obtained by claim 1 or 2, wherein the biocompatible and biodegradable granules are selected from solid granules, porous granules, hollow granules, hollow granules with at least one opening in the granule wall enclosing the interior hollow space, said opening in the wall being larger than micropores, said opening preferably of macroscopic size, and mixtures thereof.

4. Biocompatible and biodegradable implant as obtained by any one of the preceeding claims, wherein biocompatible and biodegradable granules are used, which are porous, preferably comprising micropores having an average diameter of more than 0 to about 10 μm, preferably 0.1 to 6 μm, and/or comprising macropores having an average diameter of more than 10 μm to about 500 μm, preferably about 100 μm to about 300 μm.

5. Biocompatible and biodegradable implant as obtained by any one of the preceding claims, further comprising at least one biological active substance which is integrated into the said granules and/or into the said biocompatible and biodegradable coating, and/or forming a coating layer itself.

6. Biocompatible and biodegradable implant as obtained by any one of the preceding claims, wherein mixtures of non-coated and polymer-coated granules are fused together.

7. Biocompatible and biodegradable implant as obtained by any one of the preceding claims, wherein said biodegradable and biocompatible implant is made of two or more kinds of granules, said different kinds of granules being made of different biocompatible materials and/or comprising polymer-coatings which are distinct from each other and/or having different equivalent diameters and/or comprising solid granules, porous granules, hollow granules, hollow granules with at least one opening in the granule wall, and mixtures thereof, and said implant being shaped in the required manner.

8. Biocompatible and biodegradable implant as obtained by any one the preceding claims, wherein the said granules are mixed with microspheres made of a biodegradable and biocompatible material and loaded with at least one biologically active substance.

9. Biocompatible and biodegradable implants as obtained by any one of the preceding claims, wherein said biocompatible and biodegradable granules are spray-coated, preferably in a fluidized bed machine, with the desired biocompatible and biodegradable polymer, said polymer coating having a homogenous thickness of about 2 µm to 300 µm, preferably about 5 µm to about 20 µm, corresponding to a weight fraction of about 4% to about 15% of the weight of the said implant.

10. Biocompatible and biodegradable implant as obtained by any one of the preceding claims, wherein said granules are fused together in a mold in a pressurized CO_2 atmosphere under a pressure of about 20 bar to about 200 bar, preferably about 50 bar, for a time span of at least about 3 seconds, typically for about 3 seconds to about 180 seconds.

11. Biocompatible and biodegradable implant as obtained by any one of claims 1 to 9, wherein said granules are fused together by subjecting them within a mold to a heat treatment at elevated temperatures of about 70°C to about 220°C, preferably about 75°C to about 90°C for at least about 10 seconds, typically for about 10 seconds to about 5 minutes.

12. Method for the forming of a biocompatible and biodegradable implant for the filling of a cavity in a living organism such as, for example an extraction wound or any bone tissue defect, by fusing together through polymer linkage of polymer-coated biocompatible and biodegradable granules, said granules being composed of biocompatible and biodegradable materials which are selected from the group consisting of biopolymers, bioglasses, bioceramics preferably calcium sulfate, calcium phosphate such as, for example, monocalcium phosphate monohydrate, monocalcium phosphate anhydrous, dicalcium phosphate dihydrate, dicalcium phosphate anhydrous, tetracalcium phosphate, calcium orthophosphate phosphate, calcium pyrophosphate, α-tricalcium phosphate, β-tricalcium phosphate, apatite such as hydroxyapatite, or a mixture thereof and said granules being selected from solid granules, porous granules, hollow granules, hollow granules with at least one opening in the granule wall, and mixtures thereof and having an equivalent-diameter of about 350 μm to about 2000 μm, preferably 500 μm to 1000 μm and preferably being of a regular shape, such as, for example, a spherical shape; said granules being coated with a biocompatible and biodegradable layer of a polymer selected from the group consisting of poly(α-hydroxyesters), poly(ortho esters), polyanhydrides, poly(phosphazenes), poly(propylene fumarate), poly(ester amides), poly(ethylene fumarate), polylactide, polyglycolide, polycaprolactone, poly(glycolide-co-trimethylene carbonate), polydioxanone, co-polymers thereof and blend of those polymers and said polymer layer having a thickness of 2 μm to 300 μm, preferably about 5 μm to about 20 μm, corresponding to a weight fraction of about 4% to about 15% of the weight of the said implant, and said granules being preferably sterilized and fused together within a mold by subjecting the granules for a time span of at least about 3 seconds, typically for about 15 seconds to about 180 seconds to a pressurized CO_2 atmosphere, said CO_2 atmosphere having a pressure of about 20 bar to about 200 bar, preferably about 50 bar at a temperature of about 20°C - about 37°C.

13. Method for the forming of a biocompatible and biodegradable implant for the filling of a cavity in a living organism such as, for example an extraction wound or any bone tissue defect by selecting granules of biocompatible and biodegradable materials from polymer-coated and non-coated solid granules, porous granules, hollow granules, hollow granules with at least one opening in the granule wall, and mixtures thereof, being preferably sterilized and fused together within a mold by subjecting the granules for a time span of at least about 10 seconds, typically of about 10 seconds to about 5 minutes to a heat treatment at elevated temperatures of about 70°C to about 220°C, preferably about 80°C to about 85°C, said granules being composed of biocompatible and biodegradable materials which are selected from the group consisting of biopolymers, bioglasses, bioceramics preferably calcium sulfate, calcium phosphate such as, for example, monocalcium phosphate monohydrate, monocalcium phosphate anhydrous, dicalcium phosphate dihydrate, dicalcium phosphate anhydrous, tetracalcium phosphate, calcium orthophosphate phosphate, calcium pyrophosphate, α-tricalcium phosphate, β-tricalcium phosphate, apatite such as hydroxyapatite, or a mixture thereof and said granules having an equivalent-diameter of about 350 µm to about 2000 µm, preferably 500 µm to 1000 µm and preferably being of a regular shape, such as, for example, a spherical shape; said granules being coated with a biocompatible and biodegradable layer of a polymer selected from the group consisting of poly(α-hydroxyesters), poly(ortho esters), polyanhydrides, poly(phosphazenes), poly(propylene fumarate), poly(ester amides), poly(ethylene fumarate), polylactide, polyglycolide, polycaprolactone, poly(glycolide-co-trimethylene carbonate), polydioxanone, co-polymers thereof and blend of those polymers and said polymer layer having a thickness of 2 µm to 300 µm, preferably about 5 µm to about 20 µm, corresponding to a weight fraction of about 4% to about 15% of the weight of the said implant.